

in the art would not have been led to modify the process of Agatzini by selecting various aspects of the other cited prior art to arrive at the present process.

Novelty in part of the present invention relates to a unexpected and novel discovery of the present inventors which includes a discovery making it possible to economical recover nickel from rejected coarse siliceous fraction if the fraction is subject to a heap leach process. Prior to the present invention and as demonstrated in references cited in the Final Rejection including Queneau, if one were to first separate crude ore into a higher and a lower grade, the lower grade is rejected and not processed. In other words, regardless of whether the original (crude) ore would be consider as having a low or very low nickel oxide ore content, the art is clear in teaching that were one to separate the low or very low nickel oxide ores into a high relative and low relative ore component, the low ore component would not be subsequent to further processing (see, e.g.,. Queneau). Nowhere in the art, including the cited prior art reference (as will be discussed in greater detail below), is there any teaching or disclosure which would lead one of ordinary skill in the art to separate a laterite ore into a higher grade and a lower grade and subsequently treat the lower grade to a heap leach process as claimed.

It must be emphasized that in order for a claimed invention to be found obvious, one must find that there is some apparent reason why one of ordinary skill in the art would have modified the closest prior art to arrive at the claimed invention (KSR Int'l Co. v. Teleflex, Inc., 550 US \_\_\_\_\_, 127 S. Ct. 1727 (2007)). One reason for modifying the closet prior art would be if one of ordinary skill in the art would have seen a benefit

from altering the closest prior art by adding to it or removing from it those elements that define the difference between the prior art and the claims at issue (KSR Int'l).

Applicants respectfully submit that one of ordinary skill in the art would have not been led to modify the process of Agatzini to include various elements from the processes of the other cited prior art to arrive at the claimed invention. One skilled in the art would not have seen a benefit from modifying the disclosure of Agatzini by adding to it and removing from it various steps to arrive at the claimed invention. Moreover, as will be discussed in greater detail below, incompatibilities between the process of Agatzini and the other cited references fail to provide an enabling disclosure, let alone, lead one of ordinary skill in the art to know how to modify the process of Agatzini to arrive at the claimed invention. Furthermore, incompatibilities among the respective processes disclosed by the prior art as well as clear disclosures of the additional prior art references, in some cases, actually teaching away from combining various cited prior processes with Agatzini, making the present invention not obvious in view of the prior art.

In order to provide better understanding as to why one of ordinary skill in the art would not have combined the various prior art references with Agatzini, Applicants present the following discussion of the cited prior art.

#### Agatzini

Agatzini is specifically directed to a process which addresses a problem in the art with regard to recovering nickel and cobalt from low to very low-grade nickel and cobalt oxide ores by leaching the low or very low grade nickel and cobalt or using dilute sulfuric acid at ambient temperature. The specific way in which Agatzini processes the

ore is to wet the ore with either water or some of the lixiviant (dilute sulfuric acid) in order to increase the moisture content of the ore by about 10%. As a result, the fine ore clay constituents swell and assist in agglomerating the existing fines solids. The agglomeration of the fine solids has the effect of improving the porosity of the heap which enables for adequate percolation.

There are several key differences between Agatzini and the presently claimed process which highlight why one would not have modified Agatzini in view of the cited prior art (discussed below) to arrive at the claimed process.

1. Agatzini is trying to develop an economic heap leach process to recover nickel from whole run-off-mine (crude) ore. Conversely the presently claimed method allows for recovering nickel from a part of the ore which is usually rejected, namely the coarse siliceous low grade rejects fraction (see, e.g., Queneau, in which the lower grade separated material is rejected).

2. The presently claimed process still recovers nickel from the fines and upgraded (high quality) fraction through either high pressure or atmospheric processes. Conversely, Agatzini is not concerned with pressure or tank atmospheric leach processes, as Agatzini's process relates to treating the whole of the ore. The majority of the nickel in the Agatzini process will still come from the fines in the heap leach process. In sharp contrast to Agatzini, the presently claimed process is directed to treating that ore that is normally rejected. This distinction can not be understated as it represents an unexpected discovery that useful zinc recoveries can be obtained economically by heap leaching the fraction of the ore which is usually rejected.

3. The heap leach process as presently claimed resulting in no need to conduct an agglomeration step as there is in the Agatzini reference as the fines have been removed and treated elsewhere in the present process.

One significant difference between the process of Agatzini and the presently claimed process is that Agatzini does not address the issue of what to do with the coarse siliceous low grade reject fraction. Agatzini does not process this fraction.

Moreover as alluded to above, it is a completely unexpected discovery of the present inventors that nickel can be economically recovered from the rejected low grade

fraction by heap leaching, without the need for an agglomeration step. Accordingly, this significant difference distinguishes the present application from Agatzini. In fact, in the present process, the fines and upgraded fraction are treated in a more conventional fashion than the process of Agatzini.

Furthermore, Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art to modify the clear teaching of the Agatzini process as one of ordinary skill in the art would have not know that surprisingly and unexpectedly, nickel may be economically recovered from coarse siliceous reject fraction by heap leaching. Applicants respectfully submit that one of ordinary skill in the art, based on Agatzini would not have seen any benefit from separating ore into a high and low grade and then treat both the high grade and low grade as claimed in that Agatzini clearly discloses a method which treats the whole ore. This is especially true in view of Agatzini disclosing a process which clearly teaches processing the entire ore in order to recover nickel and cobalt from the whole ore. Therefore one of ordinary skill in the art would not have seen any benefit from separating whole ore into a high grade component and low grade component in that the Agatzini reference clearly teaches that such would be unnecessary. Thus one of ordinary skill in the art would not have been lead to make such a modification as such a modification would be seen as being completely unnecessary and uneconomical in view of Agatzini which discloses a process for recovering nickel and cobalt from the whole ore.

Moreover, Applicants respectfully submit that one of ordinary skill in art in view of the further cited prior art references would not have been led to treat a lower grade nickel and cobalt fraction, were one to separate such a fraction from a whole ore, as the

prior art clearly teaches that if one were to separate ore into high and low grade components, one would not process the low grade fraction. Furthermore, it is completely unexpected and surprising in view of the cited prior art that nickel can be recovered from coarse siliceous reject fraction (were one to separated whole ore into a high grade and low grade) by heap leaching in view of the clear disclosure of Agatzini.

#### Queneau

In the outstanding Office Action, the Examiner has correctly noted that Queneau teaches that leaching efficiently can be optimized by scrapping whole ore to remove the coarse low grade fraction and subjecting the higher or upgraded fines to high pressure acid leaching. Accordingly, like the present disclosure, Queneau teaches that it is known in the art prior to the present invention to economically recover nickel from the upgraded fines fraction. Queneau is consistent with what one of ordinary skill in the art would have known prior to the present application which is that if one were to separate a whole ore into a low grade and a high grade, one would discard the low grade.

Applicants respectfully submit that Queneau cannot be considered as providing a missing link between the process of Agatzini and the present application as Queneau, if anything, teaches away from leading one of ordinary skill in the art to believe that it would be possible to economically recover nickel from the rejected, low grade, fraction. Although Agatzini teaches a method of recovering nickel from low or very low grade nickel ore cobalt oxide whole ores, Queneau teaches that if one were to separate whole ore into a higher grade and a lower grade fraction, there would be no economic benefit from attempting to recover nickel from the rejected fraction. It is only with hindsight and

knowledge in the present application that one of ordinary skill in the art would have known of any benefit from recovering nickel from a low grade fraction as claimed.

Moreover, one of ordinary skill in the art would not have seen or known of any benefit from modifying Agatzini which teaches a method of recovering nickel and cobalt from whole ore to first separating the whole ore into high and low grade fractions as disclosed by Queneau followed by conventionally processing the high grade fraction and then treating the low grade fraction subsequently as claimed. This is especially true in that there would have appeared to have been no economic benefit to one of ordinary skill in the art to incur additional process steps to recover nickel and cobalt when Agatzini discloses a solution to recover nickel and ore from whole ore. That is, in view of Agatzini and Queneau, it would have been superfluous to separate whole ore into high and low grade, as Agatzini teaches treating both together. Further, were one to separate high and low grade, contrary to Agatzini which treats both, Queneau teaches that there is no value to attempt recovery of nickel and cobalt from the low grade fraction. Therefore, one of ordinary skill in the art would not have seen any benefit in modifying the disclosure of Agatzini to include additional process steps when Agatzini provides a method which its clear disclosure describes recovering from whole ore.

## Patzelt

Applicants respectfully submit that Patzelt is directed to a completely different process, where the run-of-mine ore is first ground between two rolls and then divided into oversized and fine material. Patzelt does not relate to the processing of laterite ores and although not stated, it is likely to be a sulfite ore. In fact, Patzelt refers to a floatation step (e.g., Patzelt, column 6, line 45) indicating that it does not relate to laterite. Accordingly, one of ordinary skill in the art would not have combined Patzelt with Agatzini or Queneau.

It should be noted that in order for a claimed invention to be obvious under 35 U.S.C. § 103(a) in view of two or more references, one must apply the Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966) factors, in accordance with the holding in KSR Int'l Co. v. Teleflex, Inc., 550 U.S. \_\_\_, 127 S.Ct. 1727 (2007). These factors include determining the scope and content of the prior art. In examining the scope and content of the prior art, one must determine whether the prior art is in the field-of-invention of the claimed invention. Andersen Corp. v. Pella Corp. (Fed. Cir. 2008, page 7). Further, determining the scope and content of the prior art inquires whether one skilled in the field of invention would have considered the prior art for combination with other prior art to result in arriving at the claimed invention and, therefore, making the claimed invention obvious to one skilled in the art (Andersen Corp. at page 8). Since Patzelt is not directed to the same process as the present invention, let alone Agatzini and Queneau, one of ordinary skill in the art would not have been led to modify Agatzini and/or Queneau to in any way incorporate various processing step of Patzelt to arrive at the claimed process.

Furthermore, Patzelt does not teach one of ordinary skill in the art, in view of Agatzini, that it is economically possible to recover nickel from coarse siliceous rejected ore (low grade fraction). Further, Patzelt does not teach one skilled in the art familiar with Queneau that it is possible to recover nickel from the rejected laterite ore. Moreover, anyone wishing to modify the processes of heat leaching of laterite ores following a review of Agatzini would not consult Patzelt as Patzelt does not concern heap leaching of laterite ores.

Moreover, since Patzelt does not relate to laterite ore, Patzelt does not need to deal an initial problem of where the fines and coarse siliceous material co-exist in whole/crude ore. Further, Patzelt does not need to be concerned with the present discovery that if the ore is beneficiated by first separating into a upgraded fraction that includes the fines and clay material and a coarse siliceous low grade fraction, that it is possible to economically recover nickel from both fractions. Rather, Patzelt relates to a process where the ore is mechanically crushed, which provides for a heap with the desired characteristics to favor uniform permeability to the lixiviant and atmospheric oxygen. The atmospheric oxygen inside the heap is a reference of a desirability to oxygenate a sulfidic ore, which is not require for nickel laterite oxides.

#### Parker

Like Patzelt, Applicants respectfully submit that Parker is not analogous to laterite ore processes and therefore is inappropriate to be combined with references dealing with laterite ores in an obviousness-type rejection, in accordance with the holding in Anderson Corp. and KSR Int'l. Moreover, one of ordinary skill in the laterite



ore art would not have been led to modify the laterite ore processes of Agatzini and Queneau in view of Parker which is directed to gold and silver ores.

Further, Parker is concern with the recovery of gold ore and silver and discusses that slimes, such as clay materials, can be removed from a coarse fraction prior to heap leaching. This is done to enable the recovery of any gold and silver from within the slime material. Gold and silver ores are chemically and mechanically different from laterite ores and will be processed in completely different ways.

Moreover, Parker does not recognize that is possible to economically recover any metal value from a low grade siliceous rejected laterite fraction by heap leaching of that fraction as Parker does not relate to laterite nickel ore. Furthermore, there is nothing in Parker which would lead one of ordinary skill in the art, after reviewing Agatzini, that a better process may be to remove the fines and clay material and that it would still be possible to economically recover nickel from the rejected, coarse low grade fraction. Parker of course is aimed at recovering gold and silver in a cyanide leach which would not lead one of ordinary skill in the art in the nickel industry to know whether it remains possible to recover nickel from the coarse siliceous (low grade) fraction.

In conclusion, one important novel feature which distinguishes the present process over the prior art relates to a discovery that it is possible to economically recover nickel from rejected coarse siliceous fractions if that fraction is subjected to a heap leach process. The upgraded fraction may be subjected to pressure or atmospheric leaching which step in itself may be known, but in general, is demonstrated by Queneau, the coarse siliceous reject fraction is simply rejected. The presently

claimed process provides for a more efficient means to recover nickel than that disclosed in Agatzini as Agatzini heap leaches the whole of the ore. Neither Patzelt, Parker, or Arroyo deal with the rejected coarse siliceous fraction from a laterite ore and would not lead one of ordinary skill in the art to know that it is possible to economically recover nickel from this fraction.

#### Non-Obviousness of the Claimed Process Over the Cited Art

Referring now specifically to claim 1, the Examiner had alleged that motivation to remove the fines from coarse material comes from Patzelt in that Patzelt teaches that the oversized material may be heap leached as the interstices and pores are free from fine ore particles. While Patzelt may refer to this, the reference in Patzelt is made to a completely different ore type. Patzelt appears to be aimed at recovering copper from sulfide ore and not nickel from laterite ores. The advantage of heap leaching the reject fraction in the present application is simply that the Applicants have discovered that it can be done economically and result in recovery of sufficient nickel to make the process economically beneficial and worthwhile.

Prior to the present invention, it was unknown in the present art and one of ordinary skill in the present art would not have known from Patzelt, that it would have been economically beneficial to recover nickel from the coarse material. Accordingly, one of ordinary skill in the art would not have been led to modify Agatzini and or Queneau let alone any of the other cited prior art to recover nickel from the rejected material as one would not have expected nickel to be economically recovered.

Furthermore, the fact that Patzelt may recover some copper from a sulfite or by heap leaching the oversized ore, does not lead one of ordinary skill in the present art to

believe that it is possible to economically recover nickel from a coarse siliceous reject laterite ore. Therefore, one of ordinary skill in the art would not have been led to modify prior laterite ore processes to recover nickel from coarse siliceous rejected laterite ore.

With regard to claims 2-6, each depends directly or indirectly from claim 1 and therefore, Applicants respectfully submit that claims 2-6 are at least novel and non-obvious in view of the prior art for at least the same reasons as claim 1 and further for reciting additional elements which together with the subject matter of claim 1 are further novel and non-obvious in view of the prior art.

With regard to claim 7, claim 7 was rejected under 35 U.S.C. § 103(a) in view of Agatzini, Queneau, Patzelt, Parker, and U.S. Patent Application Publication No. 2002/0041840 (hereinafter "Arroyo"). Applicants respectfully submit that claim 7 which recites similar features of claim 1 is not obvious in view of the prior art cited in the rejection of claim 1. Further, Applicants respectfully submit that Arroyo fails to make up the deficiencies with regard to the subject matter of claim 7 in that Arroyo fails to teach let alone make obvious all elements recited in claim 7 especially with regard to heap leaching which Arroyo is not concerned but rather atmospheric leaching. It is noted that Arroyo discloses a step where saprolite and limonite fractions of a laterite ore are separated and treated separately. However, Arroyo fails to teach or in any way make obvious a process in which low grade reject fractions with respect to each of the laterite fractions can be treated separately in a heap leach process and still economically recover nickel. Arroyo does not teach or in any way make obvious to one of ordinary skill in the art to treat separately low grade reject fractions with respect to each of the

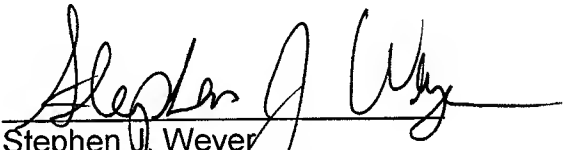
laterite fractions. Accordingly, Arroyo fails to teach let alone make obvious the claimed process in which the low grade fractions are processed to recover nickel.

Based on the foregoing, Applicants respectfully submit that claim 7 and dependent claims 8-15 and 20 are not obvious in view of the cited prior art.

In view of the foregoing, Applicants respectfully submit that the present application is in condition for allowance.

Respectfully submitted,

STITES & HARBISON PLLC

  
\_\_\_\_\_  
Stephen J. Weyer  
Registration No. 43259

1199 North Fairfax Street, Suite 900  
Alexandria, Virginia 22314  
(703) 739-4900

June 22, 2009